Building 235-F Deactivation State Update – 2021 Work Plan Item

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Brief to SRS Citizens Advisory Board

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Purpose

1) Provide an update on the actions taken by DOE in the past year
2) Provide future activities regarding Building 235-F.

235-F Street View

235-F Arial View

Building 235-F Facility Background

- **Constructed in 1954**
- **Last used in 1980's to produce fuel spheres and pellets out of Pu-238 to provide heat to electrically power long-term, deep-space missions, such as Galileo, Ulysses and Cassini.**
- **DOE accepted Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2012-1 on long term facility safety concerns.**
- **Developed Implementation Plan (IP) to address DNFSB concerns.**
- **Initiated risk reduction activities in 2012.**
- **Major risk reduction activities included:**
  - electrically isolating circuits that were no longer needed,
  - removal of combustible,
  - installation of a fire detection and alarm system,
  - removal of the material at risk (legacy Plutonium from the process areas).

Early Construction Photo of 235-F

235-F Shift Operations Base Cells 6-9

Past Years (FY2019-FY2020) Actions for 235-F

- **Commenced Material at Risk (MAR) removal Pu-238 Oxide in May 2019**
  - Used common nuclear industry techniques for MAR removal
  - Process required operators to be in multiple layers of protective clothing including air supplied suits
  - Majority of remaining material located in Cells 1&2 and wing cabinet
- **Conducted Surveys on remaining MAR**
  - Removal results showed less than 60% effectiveness
- **Revised DNFSB 2012-1 Recommendation Implementation Plan (IP) to address remaining MAR and to demonstrate worker safety**
- **Created the Deactivation Project Plan for Bldg. 235-F**
- **Completed the revised IP actions in May 2020**

View of inside cell #1.
Before & after MAR removal.

Building 235-F Path Forward

- **Prepare Building 235-F for Long Term Safe Storage via deactivation project**
- **Deactivation project started in FY 19 and will complete FY22**
- **Deactivation project activities include:**
  - Reconfigure/shutdown ventilation in Building 235-F (fans in 292-2F remain in operation)
  - Isolate all utilities/services to Building 235-F (water, steam, power, etc.)
  - Removing or fixing contamination outside process areas
  - Removing non-radiological hazardous from the facility (i.e., lead, process water, oils, etc.)
- **Further inventory removal is not planned during deactivation**

Building 235-F Final End State Preparations

- **Developing End State of facility with SCDHEC and EPA**
  - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process used for decommissioning
  - Alternatives analysis developed with the regulators to evaluate potential decommissioning end states. Four alternatives were evaluated:
    - *No action*
    - *Grout process areas; engineered roof*
    - *Grout entire building; engineered roof*
    - *Total demolition & removal of the building; soil cover over foundation*
  - Based on the risk to the workers, protectiveness, environmental impacts, and cost, the alternative chosen was *grouting the process areas on the first and second floor and emplacement of an engineered roof.*

Building 235-F Final End State Preparations - cont.

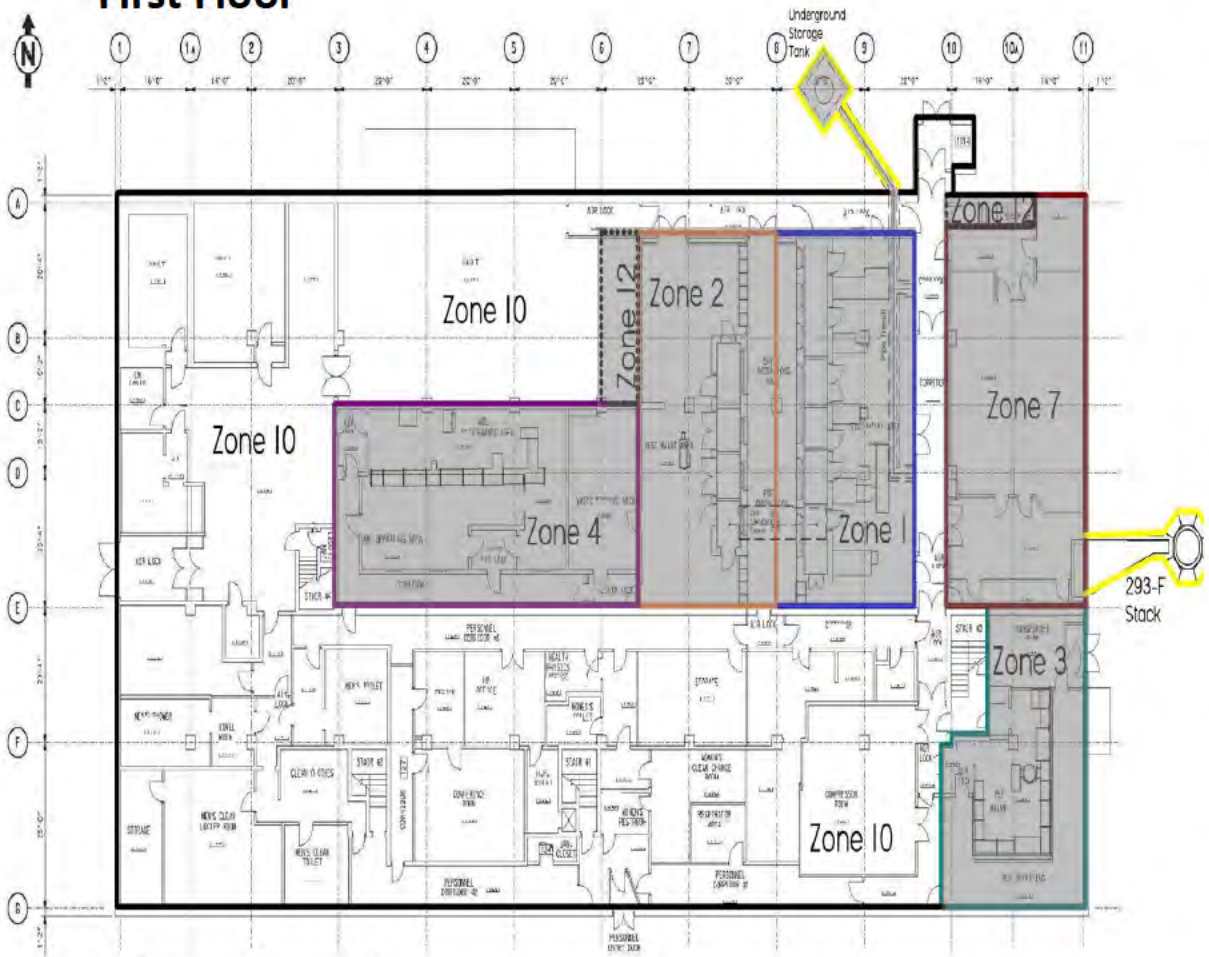
- **A Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) was developed through Core Team scoping, approved by DOE and submitted to SCDHEC and the EPA for review.**
  - Comments are expected from the regulators in late November 2021.
  - Rev.1 will be submitted to the regulators for approval.
  - The RSER/EE/CA will be available for public comment in spring 2022.
  - After public comments have been considered, DOE will issue an Action Memorandum announcing the intended action for 235-F.

In Situ Decommissioning at SRS

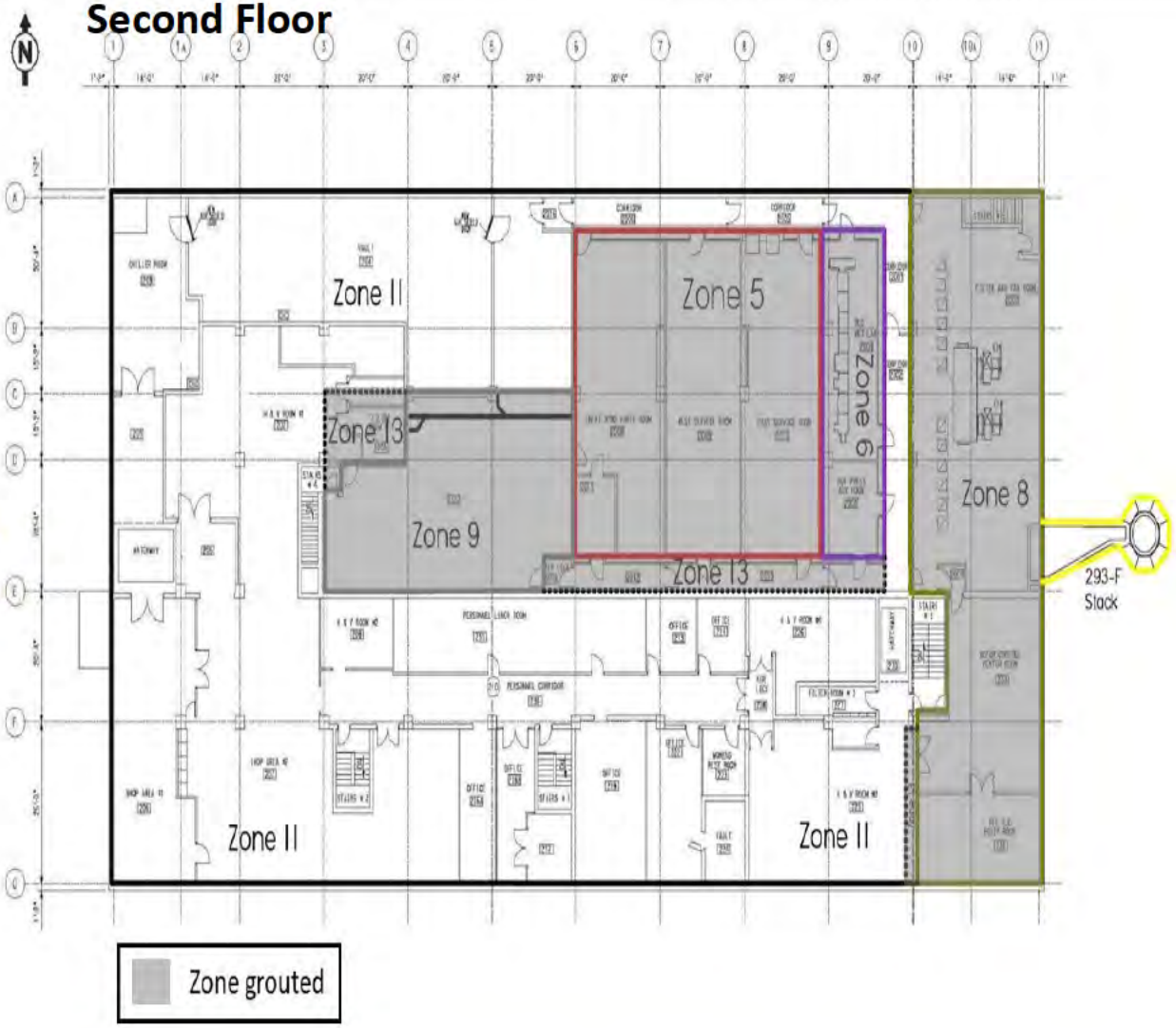
- P- and R-Reactors were decommissioned in place (2009-2012)
  - Some radiological contamination remained inside the structures
  - All access points into the facility were permanently sealed
  - Below-grade areas filled with grout
  - Eventual migration of contaminants from the degraded structure over time was modeled and evaluated for protectiveness of human health and the environment
- Reinforced, closed Building 235-F structure and grouted process areas will prevent worker or public exposure to the contaminants
- Computer modeling was performed to predict the movement of contaminants into the environment (groundwater) over a long period
  - Conservatively simulates the movement of contaminants after the structure deteriorates over time
  - Shows that the remaining plutonium-238 and neptunium-237 contamination inside the process areas within Building 235-F (and their radioactive decay products) will not exceed regulatory standards in groundwater at the boundary of F Area over a 10,000-year period

235-F Final Planned End State

First Floor



Second Floor



Summary

- DOE has conducted over eight years of risk reduction efforts for Building 235-F.
- Working to complete deactivation of Building 235-F in FY2022.
- Following the CERCLA process (RSER/EE/CA) to select final decommissioning end state for Building 235-F with regulators and public.
- Will continue to keep CAB apprised of facility progress.